



Description of EP0872648

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The present invention relates to an prolonged-adjustable tube, in particular for ski or moving sticks after the preamble of Claim 1.

With a such from the DE prolonged-adjustable tube known the spreading device an expanding element provided with a conical internal thread drilling possesses 93 19 933 U1, in which a Spreizschraube provided with a conical external thread intervenes more rotatable. This does not lead to a wide plant of the outer circumference of the spreading element at the inner circumference of the outer tube, is however regarding the uniformity and size of expanding as well as an inexpensive fabrication yet satisfactory.

Since the expanding element of the frictional support must be in the outer tube because of from plastic, no sufficient large forces for the spreading movement can become transmitted.

Object of the instant invention is it therefore, an prolonged-adjustable tube to create in particular for ski or moving sticks that initially mentioned type with which the spreading device can be expanded in satisfactory manner and with sufficient high forces.

To the solution of this object are with an prolonged-adjustable tube, in particular for ski or moving sticks that initially mentioned type, those in the claim 1 of indicated features provided.

By the measures according to invention a wide and uniform cylindrical expanding is ensured. Due to the inner member between-added between adjusting bolt and expanding element significant larger forces can become transmitted, since due to the sliding motion of the inner member within the spreading element the first from a substantial harder material, for example from metal, than the expanding element can be, which should be because of its spreading and friction effect opposite the inner circumference of the outer tube from a plastic.

Advantageous embodiments of inner member and expanding element result from the features or the several claims 2 to 8. An increase of the compression joint results within the outer tube. The other one with the fact considered is that automatic locking can become reduced, if the cone is more steep, which in particular for the loosening of the spreading device from advantage is.

To the Vergleichmässigung of expanding the inertial features indicated in the claim 9, whereby it can be convenient to plan the features according to claim 10.

To the increase of the frictional force in the initial state of the spreading device and to the adaptation at inside diameter tolerances of the outer tube the features of the claim 11 or those of the claim 13 or those of the claim are 15 provided, whereby it is convenient in each case, the features of the claim 12 and/or in embodiment of instant invention. 14 and/or. to plan 16 or 17. A corresponding simple insertion of the inner pipe into the outer tube with leading spreading device results in the case of if the features are according to claim 18 provided.

If the features are according to claim 19 provided, then achieved is in advantageous manner that a light insertion also with in not spread state tight together adapted outside and inner diameters of spreading device and/or. Outer tube in simple manner possible is. The features can be according to claim 20 and/or 21 provided in advantageous manner.

Other details of the invention are to be taken from the ensuing description, explained in which the invention is on the basis the embodiments represented in the drawing more near described and Show:

Fig 1 into partial prolonged-cut and broken off illustration an prolonged-adjustable tube in accordance with a first embodiment of instant invention;

Fig 2 an enlarged section along the line II-II of the fig 1;

Fig 3 in prolonged-cut and enlarged illustration the spreading device after fig 1 without outside and inner pipe;

Fig 4 a prolonged-cut illustration corresponding fig of 3, however in accordance with an other embodiment instant invention,

Fig 5 a längsgeschnitte illustration corresponding fig of 3, however in accordance with a third embodiment instant invention,

Fig 6 a section along the line VI-VI of the fig of 3, however in accordance with a fourth embodiment instant invention,

Fig 7 a view in accordance with arrow VII of the fig of 3, however in accordance with a fifth embodiment instant invention and

Fig 8 one the fig 7 corresponding view, however in accordance with a sixth embodiment of instant invention.

With the connection portion of an prolonged-adjustable tube 10 represented in fig 1 an inner pipe is 11 in an outer tube 12 telescope-like guided. For this the inner pipe 11 at its is provided the outer tube 12 facing end 13 with a spreading device 15, by means of which the inner pipe is wedging definable 11 in the outer tube 12 at arbitrary positions.

The spreading device 15 possesses an outer member in mould of a spreading element 16, an inner member 17 and an adjusting bolt and/or. External thread seaweeds 18. In axial direction of the tube of 10 disposed external thread seaweeds 18 held is drehfest in not represented manner with their an end region at the end 13 of the inner pipe 11. This can take place for example in the manner that the external thread seaweeds 18 in an end plug 15 inserted or with this integral is and drehfest together with this by means of a transverse pin at

<sup>▲ top</sup> the inner pipe 11 or by respective bonding held is. On the external thread seaweeds 18 the inner member 17 screwed on with its axial central inner thread 21 is. The inner member 17 is provided outside with a cone 22 and/or. cone shaped formed. The inner member 17 is so far screwed onto the threaded rod 18 that in the not spread rest a certain space and/or. Distance 23 between a narrow forehead 24 and the end 13 of the inner pipe 11 present is. The internal thread drilling 21 of the interior element 17 penetrates and is the external thread seaweeds 18 at their prominent end with a stop member 26, as for example a locking nut drehfest connected. The stop member 26 partly spreads the broader forehead 25 of the interior element 17.

The outside expanding element 16 possesses an interior cone and/or. Interior cone 27, its slope that of the outer cone and/or. - corresponds cone to 22 of the interior element 17. In accordance with the figs 1 and 3 the inner member is 17 in the against-directed expanding element 16 received free from play, whereby are 27 same prolonged with the represented embodiment outer cone 22 and interior cone. With the embodiment for example the expanding element is 16 from a plastic, while the inner member 17 from metal are.

The expanding element 16, which is outer circumference-laterally essentially cylindrical, possesses the inner pipe 11 remote, annular introduction provided with a spherical outer peripheral surface 29 and/or. Receiving part 28. The expanding element 16 is both from its leading, which outer tube 12 facing end and of its rear, which provide inner pipe 11 facing end with a Schlitzanordnung, those from two diametric each other in each case opposite slots 31 and 32 and/or. 33 and 34 exists. The pair of slots is 31, 32 34 extent-laterally offset in relation to the pair of slots 33. In the case of the embodiment thereby an uniform displacement results. In a prolonged-central transition area 36 the two pairs of slots are 31, 32 and 33, 34 overlapping provided. It understands itself that each Schlitzanordnung can possess also more than two disposed slots distributed over the perimeter. In the region Schlitzanordnungen 31 to 34, however underneath the spherical introduction part 28 and in each case the transition area 36 adjacent in each case is the expanding element from an elastic plastic ring 37 and/or. 38 surrounded, which rings 37, 38 are in an annular groove sprayed on mounted on the outer circumference of the spreading element 16 or. While the expanding element is 16 manufactured from a relative hard and outer circumference-laminar smooth plastic, the elastic rings are 37 and 38 from relative soft and outer circumference-laterally rougher and/or. handy plastic injected. The outer circumference of the elastic rings 37, 38 towers above the cylindrical outer circumference part of the spreading element 16 around for example about 1 - 2 mm, is however for instance same with the maximum

outer circumference of the spherical circumferential surface 29 of the introduction part 28. The outer surface of the rings 37, 38 can be spherical in not represented manner.

If the fixed spreading device 15 into the outer tube 12 axial at the inner pipe is pushed in with the help of the spherical introduction part 28, a sufficient, the spreading movement permitting friction between the elastic rings 37, 38 and the inner surface of the outer tube 12 results; with other words, the inner pipe 11 can become rotated, whereby drives itself the external thread seaweeds 18. Thus moved itself the inner member 17 along the external thread seaweeds 18 toward the arrow A on the end of the inner pipe 11 too, while the expanding element 16 remains standing due to the frictional engagement and by the axial relative movement between inner member 17 and expanding element 16 uniform and total surface cylindrical spread becomes. Thus raised itself the frictional engagement between the outer circumference of the spreading element 16 and the inner circumference of the outer tube 12. Ein loosening of this frictional resistance transmission made by turning back the inner pipe 11 and thus the external thread seaweeds 18.

With the embodiment of a spreading device 15 represented in fig 4' that is relative flachn Auskonus 22 and interior cone 27 of the spreading device 15 after fig 1 and/or. 3 in the manner stepped formed and/or. divided that itself several in each case Auskonusse 22' and/or. Interior cones 27' result in. In the case of same overall length of inner member 17' and expanding element 16' result steeper cones, which reduce automatic locking between inner member 17' and expanding element 16'. Also the spreading device 15' possesses introduction-struggle-hurries 28 and is with its inner member 17' on a threaded rod 18 brought. The expanding element 16' possesses a subdivision with this embodiment, with that into three cones 22' and/or. 27' provided is, three one above the other elastic rings 37' disposed in axial direction to 39'.

With the embodiment represented in fig 5 the spreading device possesses 115 two inner members 117 and 117', which are such a axial one behind the other disposed that their outer cones 122 and 122' against each other directed, i.e. with their diameter-smaller end each other opposite disposed are. Inner member 117 is up-threaded on a threaded rod 118 with for example right-hand thread and the other inner member 117' on a threaded rod 118' with for example left-hand thread. The two threaded rods 118 and 118' are drehfest connected with one another. The threaded rod 118 leading in module direction possesses the stop member 126, while the threaded rod 118' at the inner pipe 111 drehfest held is. The expanding element 116 of the spreading device 115 is integral and at its inner member 117 female end provided with a first interior cone 127 and at its inner member 117' female end with a second interior cone 127'. With tricks of the inner pipe 111 and thus the connected drehfest with one another threaded rods 118 and 118' the two inner members 117 and 117' approach one on the other, whereby a spreading of the expanding element 116 made. The expanding element 116 after fig 5 possesses like the expanding element 16 2 two formed axial one behind the other partly let in disposed elastic rings 137 and 138 corresponding after fig.

The figs 6 to 8 show variants of the elastic rings 37, 38 and/or. 37' to 39' and/or. 137, 138 of the before-described embodiments, which serve also here for it, the expanding element 16 and/or. to make possible 116 in unaufgespreiztem state an initial friction opposite the outer tube 12 independent of the diameter tolerances between inner pipe and outer tube and/or. to ensure.

In accordance with fig 6 an inner member 217 is a surrounding expanding element 216 at least a single slotted ring 237 applied and into an annular groove of the expanding element 216 placed on. The slotted ring 237 is two-layered formed, whereby the inner layer 242 located in the annular groove of the expanding element 216 consists hard plastic of one reality, while the outer layer 243 from soft reading tables, with an handy surface exists provided plastic and towers above the outer peripheral surface of the spreading element 216. About it is convenient to form the outer surface of the outer layer 243 of the slotted ring 237 in axial direction spherically. The slotted ring 337 can become thus in simple manner by resilient expand over the expanding element 216 mounted.

The figs 7 and 8 show soft reading tables of elements 337 and 338, those immediate in formations 346 and/or. 347 of the spreading element 316 introduced and/or. injected are. Soft reading tables the elements 337 and 338, those in accordance with fig 7 elongated rectangular and in accordance with fig 8 point and/or. are klecksartig, stand over the outer peripheral surface of the spreading element 316 and/or. 316' forwards and is in axial direction seen spherically formed. The used soft reading tables plastic possesses a corresponding handy surface.

It understands itself that everyone can replace the initial at the beginning of receiving elements to 237, 337, 338 soft reading tables of rings 37, 38, 37 planned to the aforementioned embodiments ' to 39', 137, 138.